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Design for a Country House.
Adelphic Society Building, Olivet, Mich.
Proposed "Home Ranch," near York, Pa.
House at North Andover, Mass.

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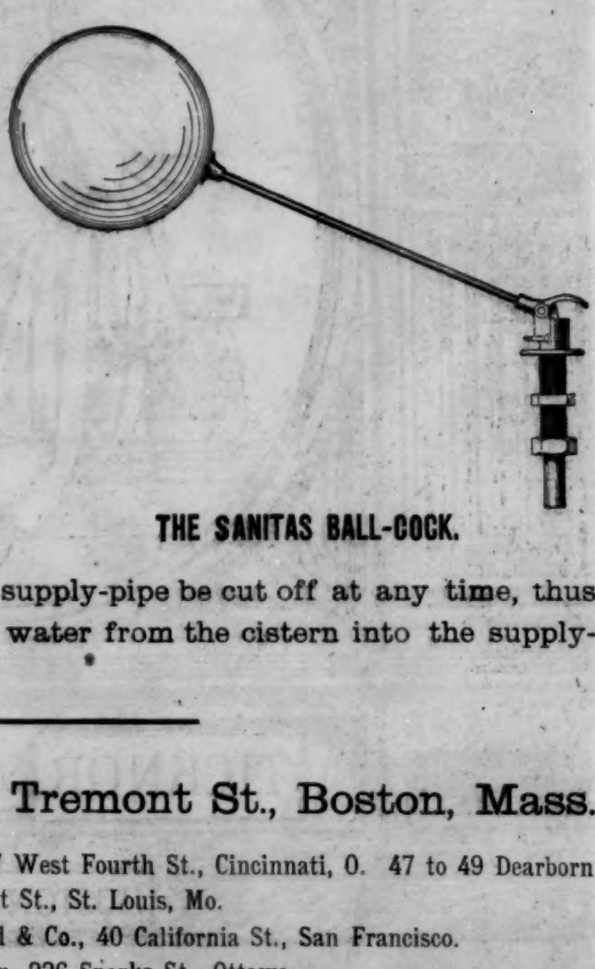

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THE New York *Times* publishes a long and earnest editorial about the new Municipal Court Building for that city, expressing the opinion that a building erected in accordance with the selected design will be "discreditable to the city and to the Commissioners who authorized its selection"; that the idea of matching the architects against each other to see who would do it for the smallest percentage on the cost put the city in an "undignified and ridiculous position," and that the best way would be to appoint a new jury, of real experts, to examine all the designs over again, and, if it should find that the one selected was really the best, to get up a new competition, which should attract men capable of making better ones. Of course, it is very unlikely that this advice will be followed, particularly as the Commissioners have already bound the city to the architects whom they have selected by a contract which it would be a costly and difficult undertaking to break; and we cannot but regret that the *Times* should not have expressed its very judicious views before, not after, the competition was decided. If a few daily papers, so able and influential as the *Times*, would come to the aid of the technical press in helping people to understand, before important competitions, the conditions which all architects of character consider essential to a fair contest, and the reasonableness and moderation of these requirements, the disgusts, disappointments and losses which attend nearly every public competition might be saved. The conditions are very simple. Nothing more is needed than to engage that the work shall be carried out, or, if not, that a suitable compensation shall be paid the architect selected for the first place; that if it is carried out, the author of the most meritorious design shall be employed to execute it at the customary commission of five per cent on the cost; that the award shall be made under the advice of one or more architects known to the profession as competent judges, and that time enough shall be allowed for men actively employed in other work to prepare, and carefully study, drawings, the nature of which shall be exactly stated in the programme. The original invitation of the Sinking Fund Commissioners allowed a very short time, about seven weeks, we think, for the preparation of a design which could not be properly studied under about as many months by an architect in ordinary practice, and no promise was made that experts would be employed to pass upon the merits of the designs. The consequence was that most architects of standing, after reading the programme, threw it into the waste-basket, where the programmes of public competitions generally go in good offices, and for the same reasons; and the field was left, as it usually is, to the few people who are willing to do themselves the injustice of getting up a crude, hasty sketch, and committing it to fortune, without any assurance that it will be fairly judged.

THE Soldiers' and Sailors' Monument at Buffalo, which was designed by Mr. George Keller, of Hartford, after a peculiar competition which some of our readers will remember, and erected under the supervision of Mr. Beebe, of Buffalo, has been found to lean badly, and an examination by expert architects and masons has shown that the foundation, which is said to be of small stones, in mortar of rather inferior quality, has given way. Of course, there is nothing to be done except to take the whole affair down, and re-erect it upon a proper foundation, and a contract has already been made for this work. Naturally, there is a certain amount of dissatisfaction among the persons interested at having to spend five or six thousand dollars in repairing damage caused by the original failure to put two or three hundred dollars in the proper place, but no one seems to know who is to blame. As usual in such cases, the most conspicuous person concerned, Mr. Keller, who was the author of the design, is the one most violently attacked, although he had nothing to do with its execution, and everything indicates that the trouble is not due to any defect in the plans. Fortunately, some of the Park Commissioners are fair enough to say that they themselves furnished the foundation; that if it had been built of proper materials it would have been strong enough, and that they supposed it was so built, but experience shows that people forget such explanations, and that in the end the reputation of the original architect, however innocent he may be, is almost sure to suffer.

TWO petitions have been presented to the Governor of New York for the pardon of Charles A. Buddensiek, who was sentenced four years ago to a term of ten years in the State Prison on a charge of manslaughter, as having been responsible for the work done in a block of houses in New York, which fell, through the washing out of the bad mortar from the poor foundations, during a very heavy rain. The petitions set forth that his punishment has already been severe enough to subserve the ends of justice, and that no harm can be done by showing mercy to an old and feeble man, who, whatever other people may have thought of his methods of building, showed his own faith in them by being the last to leave the falling houses. While we rarely like to see the arbitrary pardoning power of governors and presidents exercised, we are disposed to think that in this case it might be used to reduce to more suitable limits a punishment which may very possibly have been inflicted with too much regard to the popular feeling against Buddensiek, which was shown at the trial, and was, as usual, promoted to the utmost by the newspapers. No doubt, Buddensiek was one of the worst of the "skin" builders, and seems to have interfered directly whenever he could to cheapen material, and save labor, but he was not a mechanic, and would therefore realize much less fully than an experienced builder the danger involved in following his directions. Moreover, bad as the work done under his direction was, most architects and mechanics have seen worse work than any of his done with impunity, while there are few of the best builders who do not every day run the risk of having their buildings fall, and crush their occupants, through the carelessness, ignorance, or, too often, the malicious mischievousness of the men who work for them. It would be hard, even in the case of a master like Buddensiek, to apportion the blame fairly between him and his men, some of whom probably added improvements of their own to the "skin" system which he taught, and if, not four years, but four months in prison could be dealt out with certainty to all, masters and men, who knowingly did bad work in masonry, plumbing or carpentry, the practice of jerry building would come to an immediate end.

WE must once more call attention to the matter of the publication of Pfeiffer's "*American Mansions*," which we have undertaken in the interests of the late Mr. Pfeiffer's family. The work is issued in parts at the too moderate price of one dollar per part — the price being made low in the seemingly mistaken belief that it would cause a large number of his fellow architects to join in the movement. Three parts are now delivered, and we desire to call the attention of intending subscribers to the fact that on the completion of the work the price will be raised to ten dollars. Until that time, — the middle of September, — subscriptions will be received, as heretofore, at five dollars.

THE competition of 1889 for the Prize of Rome at the French School of Fine Arts has ended in an unusual fiasco, the jury having decided, after much deliberation, that it is not justified in awarding the prize to any one. The second place is given to M. Despradelle, pupil of M. Pascal, the third to M. Morice, pupil of M. Blondel, and a mention is given to M. Demerlé, pupil of M. Ginain. The subject assigned for competition was a very difficult one, a sea-bathing establishment on the Mediterranean shore, between Marseilles and Nice. There were ten competitors, from the best *ateliers* in Paris, but no one seems to have found the fortunate inspiration for successful work. The result will be a great disappointment, not only for the competitors who will have to wait another year, but for the members of the younger classes, who will see their own possible promotion delayed.

THE discussion upon the merits of the system of instruction pursued at the School of Fine Arts in Paris, which was begun at the International Congress, and somewhat abruptly terminated by a vote to refer to the next Congress, after it had become so lively as to endanger the harmony of the meeting, has been continued in the technical journals, with admirable decorum, but with an earnestness which shows, in a way almost touching, how deeply attached the French architects are to their great school. It must be confessed, we think, that, so far, the defenders of the school have had by far the best of the argument. The opposite party seems to find nothing better to bring forward than variations on the stock grievances which Viollet-le-Duc, M. de Baudot, and M. Paul Goût have made so familiar, that nothing but Classical and Italian Renaissance models are used there; that no attention is paid to modern requirements and materials, and that the system of design taught is "illogical;" and the illustrations by which it seeks to enforce its points are anything but convincing. M. Jourdain, for example, in a recent number of *L'Architecture*, complains that when he was at the school, the libraries of the *ateliers* contained absolutely no treatises upon Indian, Chinese or Arabian architecture, and nothing about the Mediæval and Romanesque except Gailhabaud's comprehensive book. This, he thinks, was a great deprivation, for, he says, there are, in Egypt, in Persia, in India, in China and in Cambodia, immense buildings, overflowing with richness, "the admirable creations of artists who never wore off the edges of their ruling-pens at the School of Fine Arts." Even in France, he says, are buildings of the early Renaissance which are full of beauties, and he asks why persons whose temperament inclines them toward the mediæval or the Romanesque should be compelled, like the travellers on the bed of Procrustes, to fit themselves, by stretching or amputation, to the patterns of Greece and Rome.

OF course, all this sounds well to the outsider, and the cry of monopoly, which is directed at the School, seems at first sight to have a certain foundation; but architects, particularly those who have had experience with pupils, hardly need have the fallacies contained in it pointed out to them. The ordinary, let us perhaps say, Philistine mind, cannot see why the young architect should not be permitted to lay in a stock of Chinese and Cambodian and Buddhist *motifs*, in case he should have a call for them, and resents the idea of restricting the student to one or two styles; while students themselves, particularly those who imagine that incapacity for learning the Classic proportions implies a special aptitude for "Gothic" design, are very apt, after spending about four weeks on the rudiments of the art, to make the same outcry against the "monopoly" which prevents them from inventing a new style with every design they make; but the clamor of people who know absolutely nothing of the subject, even joined with the arguments of persons better instructed, but of confessedly eccentric taste, ought not to weigh much against the experience of centuries of the most successful teaching in the world. Even supposing M. Jourdain and M. Goût to be serious in their admiration of Cambodian or Hindoo architecture, it would be preposterous to teach it in a civilized school of art. The critics of the school of architecture would not find much encouragement in an effort to introduce the study of Chinese melody in the musical department of the School of Fine Arts, or to mix a lot of barbaric Buddha figures with the Greek and Roman statues in the Louvre, as a protest against the "monopoly" by the latter of the attention of the young sculptors who frequent the galleries; yet there would be just as much reason for these innovations as for adding the study of the corresponding styles of building to the curriculum in architecture. The idea which seems to run in the head of the adversaries of the school, that an artistic education consists in the acquisition of "a full line" of architectural patterns, to suit the taste of all customers, is, fortunately, less likely to prevail in France than anywhere else in the world, and we may confidently predict that it will be a long time before instruction in architecture at the School of Fine Arts is based on anything else than the purest and noblest models of the art which the world has yet seen, namely, the constructions of the Greeks and Romans, and the Italians of the Renaissance. As to the complaint that the graduates of the school know nothing of "modern requirements," it ought to be sufficient to say, as the Frenchmen do, that the Exposition buildings which M. de Baudot and his friends point to as the embodiment of modernism in design and construction, have, almost without exception, been designed and carried out by graduates of the school, who have not found their imagination seriously wrenched, or their brains overtaxed, in devising beautiful structures of iron and glass, differing from any classical model, in which the "modern requirements" of drainage, lighting and ventilation have been perfectly and logically met.

AMONG the American pieces of construction which *La Semaine* most admires is the sliding-door, which, it need hardly be said, is almost universal here, but little used abroad. Curiously enough, the writer of the article seems to know the American sliding-door only from description, and from an imperfect description at that, for he finishes his account of it by saying that "if it could be arranged to slide in the thickness of the wall, instead of outside, it would be perfect, but perhaps this may come in due time." Architects in America, where not one sliding-door in a thousand, in dwelling-houses, slides anywhere else than in the thickness of the wall, will hardly comprehend their French brother's remark. Not only is a door which slides outside the wall never seen with us except in a stable, but in hundreds of cases double sets of doors, or window-shutters, and even sashes are contrived to slide upward, downward or sideways within the thickness of the walls. How skilfully they are hung with us, so as to move almost with a touch, we need not say; this part of the matter belongs to the province of hardware and mechanical contrivance, in which we may indeed claim a certain superiority. Whether the houses in this country are beautiful or not, we can fairly say that nowhere else in the world is it common for modest citizens to live in dwellings which are maintained all winter long, by an automatic electrical governor, acting on the steam or hot-water apparatus, at a given temperature, which can be changed at pleasure by a turn of a screw beside a thermometer; where the open fires in the grates, if needed for the sake of cheerfulness, are kindled or extinguished by a turn of a knob in the mantel; where a touch of a button in the parlor lights the gas in any desired room, or in the garden or stable, unlocks or locks the front door, brings instant information whether the basement doors and windows are securely fastened, or summons a carriage, a policeman or a fire-engine, as exigency may require; where the mistress of the house travels over it in an elevator moved by water power, and, after communicating with all her servants, without seeing any of them, brings, by the pressure of a finger, the hydraulic dumb-waiter from the kitchen or the laundry, to see if her orders are obeyed.

BUILDERS' HARDWARE.[1] — XXXII.

Fig. 489.

3. ENOCH ROBINSON. Figure 484 is a cut-glass knob set in a fluted, cup-shaped shank, with a simple Queen Anne escutcheon-plate. Knobs of this material are more commonly attached so as to show glass on all sides. Figures 485 and 486 show two varieties of plain, rectangular escutcheon-plates which are used a great deal by some architects and are always satisfactory. The knob of Figure 486 is well designed, in that the shape is suited to the purpose, the few mouldings simply used to give lines rather than detail, and the rows of beads are just sufficient to add a sparkle to the whole. Generally, the hardware manufacturer will put too much work on a knob, rather than too little. It is so easy to add leaf work or convolutions or tortured detail which passes for richness that simplicity seldom finds expression in that which dealers are most apt to put forward as artistic hardware.

The knobs shown by Figures 487 and 488 are great favorites about Boston, especially the former, which in various slight modifications is assumed to be peculiarly adapted to white paint and colonial finish. These are often used to advantage with perfectly plain, rectangular escutcheons. The plates shown here are a trifle heavy for domestic work, especially Figure 488, which is more suited to a public building.

Figures 489 and 491 illustrate two elaborate designs which were made on a special order, goods of this description being seldom kept in stock. The work is excellent in detail, though there is less purity of style than one would expect in so ambitious an attempt. Figure 489 is arranged very daintily, but with a little flatter treatment, less relief to the foliage, perhaps, and a mask which would be less literal in its modelling, this design could be rendered much more charming. Figure 491 is for a front-door, and naturally calls for a bolder treatment than Figure 489. The knob of Figure 491 [not shown] is not altogether successful. A plainer knob, such as Figure 486, for instance, would show to far better advantage by contrast with the rich detail of the escutcheon plate. The knob belonging to Figure 489 is a very common and serviceable form — not one, however, which was especially designed to match the plate.

Figure 490 is a variation on the twisted-knob pattern, with an oval form and bevelled cuts instead of flutings, giving a prismatic effect to the surface.

Figures 491 to 493, inclusive, illustrate some pieces of hardware which can hardly be classed with house-fittings. Every one is familiar with the delightful old mahogany furniture of the early part of this century, ornamented with brass rosettes and wreaths, contrasted with plain surfaces and large, swelling mouldings. This style of the First Empire is beginning to be appreciated again, and the pieces shown by the figures are intended to be used in connection with such work. The patterns are all copied directly from old French furniture, and for the purpose are artistic and very effective. Only rarely can the architect use such pieces as these, but it is easy to imagine a room carried out in the Empire style, with ornaments of this sort used not only on the furniture, but also on the doors and along the architraves, and with charming effect.

Robinson carries a comparatively small stock, his business being very largely on orders, with a great deal of fine hand-work. His goods are thought very highly of by the Boston architects.

4. The Hopkins & Dickinson Manufacturing Company manufacture an escutcheon-plate on a little different scheme from any which have been previously considered, the design being simply a flat piece of metal cut or stamped in an open pattern, the only ornamentation aside from the form, being in the shape of large nail-heads, which are studded about the plate. This sort of design can be made very effective in a great variety of forms. They also make a door-handle, with thumb-latch — a rococo design which is very prettily worked out. Figure 494 is an example of a good effect obtained by the judicious use of a minimum amount of ornamentation: the convoluted pattern on the knob is enough to add life and interest without marring the simple shape, and just a few touches of the same pattern at the corners of the plate and single dots on the key-hole cover are enough to consistently carry out the design and intensify the simplicity. Whoever designed this pattern knew just where to stop, a rare qualification nowadays. This piece is executed in bronze of a clear, old brass color.

Fig. 491.

Figure 495 is a design in oxidized-silver, with some excellent detail, notably the mask or grotesque at the top and the arabesque on the face of the knob. The shape of the knob might be better if it were more spherical. So flat a form looks well in elevation, but does not appear to advantage in perspective. Even the other extreme of an elongated sphere, Figure 496, is preferable in some respects, though this form seems to call for a rectangular escutcheon, rather than the cut plate which is shown with it.

Figure 497 is a variation of a familiar design which has already been illustrated in other makes, and is always pleasing. Figure 498 is a neat arrangement in which rope moulding is used with good effect; and another sample shows a very pleasing knob, not unlike that of Figure 494, set on a plain bronze plate, relieved only by slight, open cuttings at top and bottom.

Figures 499 to 503 inclusive illustrate a few miscellaneous forms which speak for themselves. The hinge and the escutcheon are in oxidized-silver, the others in bronze.

The Hopkins & Dickinson Manufacturing Company bears an excellent reputation in the hardware trade, turning out a very satisfactory class of goods with clean, sharp castings and effective chased work, special care also being given to the colors of the metal, and with exceptional results.

The four manufacturers whose hardware has been illustrated are considered among the best in the country, and, given the same design, one would do quite as good work as the other. Mechanical excellence has been carried to a pitch where there is no difficulty in having the work done well. The great lack always is in ideas, and these are supplied only by careful, intelligent study on the part of the designers, and an appreciation of artistic work on the part of those who purchase and use the hardware; and it is quite possible that any deficiency in the æsthetic quality of our modern hardware may be due as much to lack of appreciation as to any lack of proper artists. But it must not be supposed that these are the only manufacturers who are capable of turning out good hardware. The illustrations may be considered as general rather than special, and as showing the possibilities of not only the four firms named, but of the majority of the hardware manufacturers.

[To be continued.]

[1] Continued from No. 712, page 71.

FOREIGN VS. AMERICAN MECHANICS. — The Paris correspondent of a representative American mechanical paper writes, as the result of his observations at the Exposition: "It appears to me that we are laying too much stress upon the superior intelligence of American mechanics. The European mechanic is not the stupid fellow we have pictured him as being. I have talked with Alsace and Belgian mechanics, being referred to them because they could and the exhibitor could not speak English — mechanics engaged in erecting machinery at the Exposition — and found them men of excellent intelligence, and having a good deal of knowledge of mechanical matters. All our traditions are against this, but traditions sometimes falsify facts. In mechanics' tools, however — squares, standard scales, verniers, micrometers and the like — I have seen nothing that appears to me as good as those of American manufacture. These American tools look better, are cleaner cut and more convenient. In wood-working machinery I think we excel at the Exposition. Our machinery appears to do better work, and to do it more completely; that is, it leaves less work to be done by hand. I have, however, never seen better castings than most of those in the European machinery. In general appearance the castings made on the continent indicate that the moulder does not use the trowel and sleek as much as the American moulder. Perhaps he has better patterns to work from. In steel castings Europe appears to be ahead of us in the matter of producing sound work."— *Exchange.*

AN ARCHITECTURAL KNOCKABOUT.[1]— VII.

My time being limited, I resolved after my stay in Paris to see more of Southern France before going to England on my way home. So I started for Gien, where I sketched that beautiful bit of Rennaissance — le Palais de Justice. Here I had a fine time. I have always made it my aim to be as polite as possible to the natives, and this, I must acknowledge, for a great many politic reasons. They appreciate kindness, and usually return two-fold of that article for what they receive. Here at Gien I had an example of it. Gien is a queer little place, with a splendid château on a very great eminence, and a funny little farm-house hostelry, with a café directly opposite it. It was in the evening; I had finished my dinner and then went over to this café to get my after-dinner coffee. I had caught a cold and was feeling rather melancholy. Soon the pleasant-faced proprietor came and asked me kindly what I was doing in Gien. I replied that I was an American architect, making some little sketches in la belle France, and, having heard of the beautiful town of Gien, came hither. This had its effect, and I showed him my sketches. If there is anything these hospitable French countrymen enjoy, it is simple art. He thereupon called up Jean and Jacques, and many others to enjoy them with him. I was a great lion for the time being, and answered all their questions, as a great lion should. "Was it like photography? and could I sketch anything I chose? Could I take the house opposite?" "Yes," I said, "I can try to do all these things;" and to amuse them I made a rapid little drawing of my old hotel. This was passed around by admiring hands. About this time in came the proprietor's wife with her child in her arms — a buxom lass she was — who also became very much interested. I

asked her to keep still a moment; she blushed deeply and complied. I made a rapid sketch of her and her baby in color, which came out very decently. I presented it to the happy father, amid the plaudits of my amiable audience. My cold was quite troublesome, and soon after the crowd of men retired the proprietor came to me with a great bowl of some French decoction known as "*grog*." He said the gentlemen had sent it over, wishing Monsieur to drink it immediately and go to bed, and that his cold would be gone in the morning. I thanked them warmly, knowing that if one does not accept proffered kindnesses of this sort, it occasions disappointment. The proprietor enquired when I was to leave; I told him, the next morning, for Nismes. I found out, to my chagrin, that I would have to walk across country nearly a mile in order to catch the "bus" for the station. Gien is two miles from its railroad terminus.

The next morning I awoke feeling like a lion — of a different breed from the one of the evening before — after a refreshing sleep. My breakfast was ready for me, with many things I had not ordered. I made arrangements to have my baggage ready for my walk to the bus crossing. I then asked for my bill, and was more than surprised when I was informed that it was settled, and told that the gentlemen hoped I would take it as a compliment from them. Goodness! this was indeed delightful. In going to the door a new surprise awaited me. There was my baggage nicely stowed away in a tumbrel cart, and two or three of my new friends (gotten up in their best with ribbons and frills) had come to take me to the station. You have no idea how this unexpected attention touched me. I accepted it with heartfelt thanks; and when we parted at the station, it was with difficulty that I could express to them my appreciation of their kindness. Their great bronzed faces became strangely quiet as they shook hands with me. — I shall never forget Gien nor its people. Some day I'll go back there, and they'll remember me too.

I went to Nismes to see the great amphitheatre. To Avignon and Tarascon, and at last decided to go to Arles. Here I knew there was still another amphitheatre. At each of these visitations I had been told the same tale of how "the Romans with thirty thousand troops cleaned the town." At each repetition it was necessary to fee the guide, a process which became both monotonous and expensive, and I resolved that nothing would tempt me to listen to these impudent guides again. I reached Arles on Sunday, when I knew that the common people would be sure to wear their native costumes, so that my visit there promised me some artistic enjoyment in the way of picturesque color.

At the station the first thing I saw was a notice to the effect that two murders had been committed the night before, and all strange and foreign characters were to be looked after carefully. This was a pleasant sort of an item to welcome a lonely traveller indeed! The beautiful old ruin, wonderfully preserved, faced the street up which I went. Crowds of men and women, with more than the ordinary accompaniment of the military sprinkled among them, were promenading up and down the avenue, which was lined with innumerable cafés. The women were most of them good looking, wearing headdresses of black lace or handkerchiefs and red and black skirts. They were evidently enjoying themselves, as they were all talking at the same time on the gay boulevard. I resolved to see the plan of the amphitheatre, out of curiosity, dispensing with the troublesome services of the inevitable guide with the same old story of the "thirty thousand Romans." On entering I saw a notice saying that "travellers will please not fee the guide as he is a Government official and derives his income therefrom." This was conclusive, and with the law on my side nothing should alter my determination. So leaning against a great column I took in the grand old oval. It was much the same as the others I had seen, but this was by far the best preserved. Soon a smooth-faced, keen-eyed, lanky guide came sidling up to me and asked if "Monsieur would like to have the place explained."

"Monsieur would not," I replied.

He then said, "What, not have it told him how thirty thousand Roman troops came and cleaned the town ——."

"No," I said. "No."

"and the lions ate ——."

I said "No."

"Ah! well if Monsieur will listen and see if he has good ears, I will go to the farther end of the amphitheatre and snap these two coins together. Note the wonderful acoustics of the place?" I had no time to stop him, and on his return and in answer to his question of how many times he had snapped them together, I replied, "Eight times." This seemed satisfactory to him. I then started to go out, but he insisted upon my buying some photographs. Upon my refusal, he got very angry and demanded a "fee." "What for?" I asked. "For showing you the place," he answered. He was all the time getting more and more angry, and to save a row I handed him fifty centimes. Holding it out in the palm of his hand he said sneeringly. "What's that?" "Well," I said getting angry in my turn, "it's a big lot more than you deserve." Whereupon he remarked that he wished two francs from a gentleman like me. An English gentleman, too. I informed him that I was not an English gentleman, and said, "Well, give it back to me." This he did, undoubtedly thinking that I would give him the amount he had demanded; but I deliberately put the half-franc piece back into my pocket. He became simply frantic, and shrieked out that I should n't get out of the amphitheatre till I had paid his fee. "We differed," and he started to run towards the gate, and I after him.

At the end of a passageway, which was the main entrance to the ruin, was a great iron gate for the purpose of keeping out the people when the place was used for bull-fights, as it was in summer. Just as I was passing him at this point, both rushing madly for the gate, he stopped and put his elbow up sharply catching me under the chin, making me bite my tongue terribly. The pain was maddening, and yelling to him to open the door, I sprang at him, upon his refusal, and sat him down on the cold floor easily and tore open the door and emerged into the street endeavoring to compose myself to appear as if nothing had happened. Out he came after me yelling at the top of his lungs, "*Canaille d' Anglais!*" "*Espèce de singe!*" and a few other choice bits. The situation was far from pleasant.

[1] Continued from page 90, No. 713.

Crowds immediately came around us, and then awful thoughts came to me as two gens d'armes caught me by the collar. My irate friend commenced to condemn me, by saying that I was a dog of an Englishman, and had made him show me all over the place and gave him not a sou, and also that I had dared to lay hands on him. I

I address the Populace.

essayed to speak but was stopped till he got through, I then composed myself as well as I could and resolved on bold action. The women, I knew, ruled the town completely, at least I had heard so, and it is by far an easier task to talk to women than to men. So I commenced my defense, after having heard one or two women who were crowding around say pityingly, "*Pauvre garçon noir.*" This was encouraging, so I delivered the following in my best French, very slowly and very much to the point: "*Attendez:*" I said: "I'm not a dog Englishman, but a free-born American, like all of you in the Republic of la belle France [I kept saying la belle France over and over again.] I came here as a young architect sketching the beautiful wonders of la belle France, [Here the grip of the gens d'armes on my collar sensibly lessened] and also to see [bowing] the *lovely women* of Arles of whom we, in America, have heard so much. [Here the grip on my collar left it entirely.] I did not ask this man's guidance.

Comfort at last.

He tried to make me give him money; tried to make me buy photographs, and I gave him fifty centimes. This he threw in my face, and started to lock me in the amphitheatre! Think of it! After first having struck me — Mesdames! Messieurs! I, a free-born American, from America, to whom you gave the beautiful Bartholdi statue, [yells of approval] which I see every morning from my chamber [I, living in Boston] I ask you, could you stand it [No! No!] in la belle France?" This seemed to have an immediate effect — with a whoop, all the crowd pounced on the poor unfortunate scamp and hustled him away — the women kicking him and slapping his face. This was a complete victory for me, so knowing I must do something in return for this gratifying and unexpected result, I invited those of the women who had rendered me the most efficient services and politely conducted them, on each arm, to a café, where, as we students say, I "blew them all off" to coffee. I was the greatest man in Arles that day, but I left town by the afternoon train just the same, my regard for the female proportion of the French people being very high.

Good-bye, Europe.

Leaving Arles I journeyed to Marseilles along the Riviera, to Cannes, Nice and Monte Carlo, where at that wicked kursaal — fascinating place — I made the usual "five-franc dash," and with so much success that I had a big dinner, bought a new hat, priced a yacht and went back to Paris in a first-class compartment.

My time was nearly up. I was very anxious to "have a hack" at England and get to London; so I said good bye to all the good friends I had made during my vagabond travels. Among these were two fine fellows, brothers, from Rochester, young architects, who travelled a long way with me and whose kindness in many ways I shall never forget; and another young architect whose hospitality at Paris and the pleasure of whose company on a little trip I enjoyed most heartily.

Going by Amiens to Dover, I arrived in London, where I stayed three weeks. The weather being very bad I could do but little sight-seeing in town or sketching in the country.

Then embarking for home in the White Star Steamer "*Adriatic.*" I arrived in a most happy "state of states," having many times during my "Knockabout" thought that peradventure I might never see my native land again. So with thanks to all who have been kind to me, and to you, kind readers, for looking this little history over, and to Heaven for keeping me safe through it all, I end these reminiscences.

F. L. V. HOPPIN.

ARCHÆOLOGICAL FINDS IN ITALY.

THE excavations being carried on in the Province of Grosseto, just at the place where formerly rose the Etruscan city of Faleria, rendered celebrated by the siege of Camillus and by the treachery of the schoolmaster who proposed to the Roman general to deliver to him the children of the leading nobles of the besieged city. These excavations have brought to light a tomb containing jewels of rare richness and utensils very finely ornamented, amongst others four bracelets and three gold fibulas, an amber collar composed of nude female figurines and squat cynocephali, also a copious assortment of small chased objects, and finally the complete armor of a cavalier: the bracelets presented this peculiarity, that they enclosed several human teeth — a peculiarity which has been met in no other Etruscan tomb. The tombs of Faleria were circular in form, like all those which have been discovered in the same region, and which by this token differ from tombs discovered in other Etruscan cities where they have ordinarily been of the rectangular form. These archæological finds will little by little furnish for students the necessary elements for reconstituting the history of the Etruscan people, whose original and ethnographic characteristics are still uncertain. Hellanicus considers the Etruscan race a derivative from the Pelasgian nation; Herodotus pretends that the Etruscans formed a detached fraction of the Lydian race; and Dionysius of Halicarnassus refutes Hellanicus and Herodotus, and affirms that the inhabitants of Etruria were aborigines. We shall only know the real truth when the Etruscan inscriptions have been deciphered. For the moment we know the alphabet which the people of central Italy used; we know, likewise, a hundred words or so which we often discover on their tombs or under the paintings which ornament some of them; but we have not yet been able to translate consecutively the Etruscan inscriptions which will reveal to us, sooner or later, the secret of the origin of this enlightened and civilized people, whose power probably extended from one end of the peninsula to the other, contrary to the ancient ideas which restricted to the Tuscan region the dominion of the Etruscans. There have been found on the slope of the Adriatic, in upper Italy, in Campagna, and even in Sicily, archæological remains which prove, on the contrary, that this intelligent and refined race was scattered pretty much everywhere. From the standpoint of the history of art, the studies into the history of Etruria will bridge over a regretable break, especially if they will permit us to fix the precise measure in which the invasion of the Greek artists contributed, in the first place, to perfect Etruscan art, and in the second place to determine its corruption and decadence.

There has just been classified at the Museum of the Capitol a piece of Bacchic sculpture, which has recently been found in a nymphæum in the neighborhood of the Porte San Lorenzo, the sculpture representing a gigantomachia. The peculiarity of this important find consists in this, that the two personages who compose the group are finished off as serpents, a development which was quite unexpected when the fragment was unearthed, for the marble was imperfectly cleaned, and it was not possible to clearly distinguish its contours. The serpent formed an integral part of the worship of Bacchus. In the piece of sculpture in question we see a young satyr thrown to the ground, at whose side still stand the serpentine remains which served the conquering giant in place of legs, one of which envelops in its spiral fold the right arm of the dying victim.

The *savants* who interest themselves with archæological questions have all remarked that the satyr presents a striking analogy to the celebrated "Dying Gladiator" in the same museum, not only in the general position of the body, but also in the cut and disposition of

his hair. For a moment it was thought that this fragment formed a portion of a larger composition, and this supposition was strengthened by the fact that in the same locality there had already been found at a little distance two other satyrs conceived in the same style; but a more attentive examination has caused this hypothesis to be laid aside, particularly as the form of the plinth, which is perfectly detached and complete, admits of no presumption that it was accompanied by other statues.

In the same museum has also been placed a marble altar dedicated to the lares of Augustus, found in the region of Arenula, and dating back to the year 756 of Rome. This morsel is in a general way quite well preserved, and has only suffered slight damage in its upper part. The bas-relief on one side represents the libations made to the gods by the worshippers, who are clothed in togas, and have foreheads veiled and crowned with laurel. The priests, likewise crowned with laurel, are present at the ceremony, while the assistants bring the victims to the altar — the bull and hog — the first a sacrifice to the genius of Augustus, and the other to the lares. Upon two sides of the monument are sculptured in relief the figure of a lar. This domestic divinity is presented in the form of a young man holding a branch of laurel in his right hand, and raising in his other hand above his head a symbolical horn. This monument is of rare preciousness, the archæological collections containing only two pieces which can be compared with it. There are known at present only two altars dedicated to the lares of Augustus, one of which is found in the Vatican Museum, and the other in the Museum at Florence. The altar which is in the Vatican was consecrated in the year 747 of Rome, and is ornamented with bas-reliefs on four sides. Here we see on one side two lares and the genius of Cæsar Augustus, with veil and toga, and on the opposite side a crown of oak leaves and two laurel plants. Upon the two other sides are represented the sacrifices. The altar at Florence is of more complicated and finished design. Upon one side we see Augustus clothed with the ordinary attributes, which are the toga and veil, and having at his right a personage who is supposed to be Lucius Cæsar, and at his left his wife Livia, bearing in one hand the patera and in the other a coffer of incense. Between the emperor and Lucius a fowl is pecking something from the ground. The left side is dedicated to a trophy, over which rules an image of Victory. The opposite side contains the images of the lares, and on the rear face is a crown between two laurel plants. The perfect similarity of the symbols and attributes and analogy of the personages leaves no doubt as to the close connection which exists between the three monuments, which, within a few years, date from the same epoch. H. Mereu.

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

CHRIST CHURCH CATHEDRAL, MONTREAL, P. Q.

[Gelatine Print, issued only with the Imperial Edition.]

Y. M. C. A. BUILDING, ROCHESTER, N. Y. MESSRS. DUFAIS & CANFIELD, ARCHITECTS, NEW YORK, N. Y.

THIS structure will occupy a frontage of 60 feet on South St. Paul Street, and of 160 feet on Court Street, the main frontage being on St. Paul Street and overlooking the Genesee river. The main entrance is on the St. Paul Street side, and is also the approach to the public staircase and elevator, leading to the office floors above the Association rooms. The main entrance to the music-hall is placed at the centre of the Court Street front, and communicates with a large lobby from which, on either side, staircases lead to the foyers above. The placing of the library below a portion of the gallery of the main hall is a considerable economy of space, besides affording an admirably adapted place for the books, and the device by which the staircase communicating with the various stories of the Association rooms is placed in the same stair-well with the public staircases leading to the upper or office portion of the building, has proved a very important saving of floor-room. The Association will occupy the rooms up to and including the third floor, with the exception of the store on the ground floor. The fourth, fifth and sixth floors will be used for offices or other purposes. From the reception-room opens a leisure-room with a cosy fireplace and seat. Opposite this, on the corner of the building, is the parlor. Next to this, the private office with a fireplace. At one end there are large windows, from which a beautiful view of the Genesee Rapids is had. At the other end, a large archway to the public reading-room and library. Adjoining the office is the coat-room, and next to that the lecture-room, with a seating-capacity for 200. At either end of the reception-room, on the mezzanine floor above, is an arched balustrade with loggias. It will be seen that the office is so arranged as to command a view of all the approaches and egresses. In the basement is the gymnasium, two stories high, which will be fitted up with all the latest and best known appliances. Around the gymnasium is a wide, elevated running-track. Adjoining are the bowling-alleys, the wash-room with shower, needle and sponge baths, and other approved accessories. Off the wash-room is the swimming-bath. Above the rear end of the reading-room, and overlooking it, is the members' reading-room and library, reached by a small staircase — this room being planned from the space between the foyer and gallery of the hall. Two small assembly-rooms, arranged to throw into one if desired, occupy one side of this — the mezzanine floor and a study and gentlemen's toilet-room occupy the other side. This floor is reached by way of the Association staircase from the reception-room, around the elevator, which staircase continues at the rear loggia at the end of the reception-room to the third floor. The third floor contains the Directors' room, a large dining-room with kitchen adjoining, capable, by way of dumb-waiter, of serving all the Association floors, and a ladies' toilet-room, one reading and game room for boys, and two class-rooms. The music-hall has a seating capacity of 1,000 including the gallery. Under the lobby is the bicycle-room entered by way of a separate doorway on the level of the sidewalk. The stage entrance is at the rear end of the building, and is used for the tenants occupying the fourth floor and the janitor's living rooms. The hall will be ventilated by forcing-in moderated air through the auditorium floor, and drawing the foul air out through a shaft in the centre of ceiling which runs to the roof. The building will be constructed of Sayreville, N. J., face brick for the first story and local brick with terra-cotta and copper ornament and mouldings above, enriched around the main entrances. The constructional parts will be constructed on iron columns and girders throughout, and the elevator staircase will be fireproof. The cost of the building and site will be about $150,000, furnished complete.

ARTISTIC HARDWARE, MANUFACTURED BY ENOCH ROBINSON.

ARTISTIC HARDWARE, MANUFACTURED BY HOPKINS & DICKINSON MANUFACTURING CO.

See article on "Builders' Hardware," elsewhere in this issue.

NEW YORK ACADEMY OF MEDICINE, NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A COUNTRY HOUSE. MR. E. H. HAMMOND, ARCHITECT, NEW YORK, N. Y.

ADELPHIC SOCIETY BUILDING, OLIVET, MICH. MESSRS. SCOTT & SON, ARCHITECTS, DETROIT, MICH.

PROPOSED "HOME RANCH," NEAR YORK, PA. MR. FRANK S. MEAD, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF MOSES T. STEVENS, ESQ., NORTH ANDOVER, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE REMOVAL OF ROOF-WATER FROM BUILDINGS.

Staircase in the Hotel Cluny, Paris. From *le Moniteur des Architectes.*

MR. DWIGHT PORTER, Ph. B., of the Massachusetts Institute of Technology, recently contributed a paper under the above title to the *Technology Quarterly*, which is of such interest to a large number of our readers that we republish it herewith:

In most cases roof-water will soon take itself off without assistance, but its manner of doing this and the final disposal thus made of the water are not always satisfactory. Dripping eaves projecting over city sidewalks would be an intolerable nuisance; and whether in city or country, rain-water allowed to fall freely from the roof to the ground next the building tends to dampen the cellar foundations and walls and thereby to injure the health of inmates of the building, as well as to harm the structure itself and property contained within. It, therefore, becomes essential to direct the course of water falling upon the roof and to convey it away to a proper point of discharge. To effect these purposes various arrangements have been employed, some of which will be mentioned.

For directing the course of the water, as it is received upon the roof, to a suitable point of discharge, we have gutters. On old-fashioned country houses these were often made from a log of moderate diameter, sawed lengthwise, gouged out, and supported by hooks or brackets under the eaves. In modern construction the gutter is very commonly made angular in cross-section, formed upon a wooden cornice, with a protecting sheathing of tin, galvanized iron or copper. Half-round or angular gutters of these metals are also used, hung at the eaves. Leaders, conductors or rain-spouts, as they are variously termed, receive the discharge from the gutters, and, descending toward the ground, convey the water a stage farther in its journey. The problems connected with rain-leaders are not very intricate, but yet they have not always been well-solved. It is not a difficult matter to arrange a few leaders for receiving the roof-water of a building; but from mistaken economy, or from lack of knowledge or of forethought in the matter, they often prove inefficient when most needed, and are a constant source of trouble and expense. Their size, which is commonly determined by experience and judgment, and not by calculation, ranges in diameter from two to six inches. The two-inch pipes are too small to serve to advantage as main leaders on almost any building, being easily choked; three-inch and four-inch pipes are suitable and common sizes for ordinary dwellings and small commercial buildings. The five-inch and six-inch sizes find employment on large structures.

The Produce Exchange Building, in New York City, with a roof area of three-fourths of an acre, roughly speaking, has twelve leaders of about five inches diameter. The roof, which is paved with fire-brick, is graded with slopes of perhaps one in fifty toward the points at which the leader-openings are placed, most of these draining-surfaces being about 40 x 70 feet each. The provision here made is equivalent to about one square inch of leader-opening to 140 square feet of roof-surface. On the Sloane Building, at Nineteenth Street and Broadway, with a roof area of 18,000 or 20,000 square feet, sloping one in twenty-five, there are two leaders of about six inches diameter, and a third rectangular, 4 x 6 inches. This gives an allowance of 240 square feet of surface to the square inch of leader-opening, while on the Massachusetts Hospital Life Insurance Company's Building and the Hemenway Building, in this city, the proportion is only from sixty to seventy square feet to the square inch of opening.

	Approximate roof surface.	Approximate surface per sq. inch of leader opening.	
Produce Exchange building, New York	33,000 sq. ft.	140 sq. ft.	twelve 5-inch leaders
Sloane Building, New York	19,000 sq. ft.	240 sq. ft.	two 6-inch leaders and one 4 inches x 6 inches
Massachusetts Hospital Insurance Company's building, Boston	6,000 sq. ft.	70 sq. ft.	seven 4-inch leaders
Hemenway Building, Boston.	4,000 sq. ft.	60 sq. ft.	five 4-inch leaders

Whether a roof slope steeply or gently, there is a certain amount of water falling per second or per minute in storms, which must be removed; but I have learned of no generally recognized rule among architects as to the leader provisions which should be made for it. A vertical rain-leader does not, of course, run full-bore, even in the hardest storms, and if carried down from the roof with its course unbroken by sharp bends, and if given a suitable opening at the top, there is probably little danger of its proving inadequate. It is very common, however, to introduce abrupt changes of direction to suit peculiarities of architecture, by which the carrying-capacity of the pipe is curtailed, and liability of choking by leaves, rubbish and ice is greatly increased. On a business block on Sudbury Street, in this city, may be seen a rain-leader which, within a few feet of the point of leaving the gutter, makes four abrupt and nearly right-angled changes of direction. It will frequently be noticed on buildings, also, that the immediate connection between the gutter and a four-inch leader of ample capacity is effected by a very much smaller pipe of lead.

In connection with important buildings there is perhaps more need of caution in designing the drain of suitable size than in fixing upon the size of leaders. Formerly house-drains were made entirely too large, an error which has come to be recognized and has led to the practice of using comparatively small sizes. These are advantageous for procuring an effective scour of the pipes by the slight flow of ordinary house-drainage, but have in numerous instances proved practically insufficient for managing the volume of water furnished by heavy storms, which is doubtless often hundreds of times as great as that coming from interior house-drainage. In the Sloane Building, to which reference has already been made, I am informed that it was found necessary, on this account, to enlarge the main drain from eight inches diameter to ten inches, considerable damage having been suffered two or three summers ago from a flood of rain-water during a severe storm.

A practical difficulty connected with the delivery of roof-water to the house-drain has also been experienced under certain circumstances, in the apparent carrying along by friction and imprisonment of a large amount of air by the descending column of water, and a consequent pressure on the traps of connecting pipes, and even a serious interference with the flow in the main drain itself, unless relieved by ample venting. An instance was mentioned to the writer by Mr. John C. Collins, Chief Inspector of Plumbing for the New York Board of Health, in which very considerable injury to property resulted in this way, the rain-water bursting out near the bottom of a leader and flooding the basement of a building. The leader ran down the rear of the building, the main part of galvanized-iron, succeeded near the bottom by a cast-iron shoe connecting with the drain. In the drain was a running trap near the foot of the leader and another near the front of the building. Two stacks of waste-pipe and a stack of soil-pipe joined the drain between the traps, and there was near the front of the building the usual four-inch fresh-air inlet. Still, the five-inch drain appeared incapable of serving the leader in heavy rains, and the water would back up ten or twelve feet high in the leader and overflow at the top of the cast-iron shoe. That the trouble was due to the interference of the imprisoned air was indicated by the fact that it was partly relieved by inserting a two-inch air-vent between the leader and the first trap, and entirely overcome by a three-inch vent. Now and then we find the roof-water carried to the street sewer in an independent line of pipe, but the usual and what is generally considered the preferable practice is to conduct it directly into the house-drain, sometimes at the back end, sometimes at the front, just inside the main trap, and again at both these or at intermediate points, according to circumstances.

On a large proportion of city buildings the rain-leaders run down the outside of the walls, but yet in a considerable number they are carried down within the walls, in which case it is evidently desirable that the same care should be taken to prevent the escape of drain or sewer-air through defective material or joints that would be taken with stacks of soil or waste-pipe. Consequently we find in the public regulations in force in large cities requirements that the leaders shall be constructed of iron (in New York copper may also be used) if carried within the walls. In New York City it is permitted that leaders of iron or copper shall be without traps, unless the top is near a window, in which case a trap is required at the base. In Boston, however, all leaders must be trapped in new construction.

The troubles encountered in the practical service of leaders and gutters are occasioned in part by their becoming choked with leaves or rubbish, but principally by their being clogged and burst by accumulations of ice in winter. Leaves and rubbish may be largely excluded from leaders by the use of wire-strainers or iron-gratings, though these, of course, do not prevent accumulations outside and near the tops of the leaders. In the midst of a large city, however, leaves are usually strangers, and in a cold climate the trouble with gutters and leaders comes from ice. It is very common to see a tin or galvanized-iron leader brought from the roof down the face of a building and terminating in an iron "pipe-shoe," as it is called. Such an arrangement will be found on the brick blocks of tenement-houses on Nashua and Billerica Streets, for example, in this city; and walking through these streets it will be noticed that nearly every one of the cast-iron shoes has been split by ice. Leaders often become incased in ice to the size of a barrel, from top to bottom, while from the gutters and eaves depend huge icicles which threaten the heads of passers below. These troubles from ice cannot in all cases be conveniently and entirely avoided; but on important buildings it is perfectly practicable to escape them by proper location of leaders and gutters, by the use of pipes of suitable material and shape, and by supplementary employment, in some cases, of steam.

On steeply-pitched roofs gutters are naturally found at the eaves, either built out or suspended, as has been before mentioned, with leaders running down on the face of the walls. But large business blocks are now very commonly built with tolerably flat roofs, a long slope from front to rear being succeeded by a short rise to the edge of the roof, the V-shaped channel between the two slopes serving as an ample gutter. Sometimes, indeed, as on the Morse and Wilde Estate Buildings, on Washington Street, in this city, the roof is given a slope from both front and rear toward the centre, where the gutter channel is thus formed. In either of these constructions, the gutter being entirely upon the main part of the roof, it is natural and easy to carry down the leader within the building, and where this is done little or no difficulty is experienced from ice. Rain, snow and ice then take care of themselves, and the heat of the building, supposing it to be occupied, is found sufficient in this climate to prevent accumulations within the leader.

MATERIAL OF CONDUCTOR-PIPES.

As has already been said, the regulations in large cities would prescribe for such cases iron or copper-pipes, which, indeed, would naturally be employed. The same materials may be and often are utilized also for outside leaders, but galvanized-iron and tin are far more common. The choice of material is important, chiefly in connection with the lasting qualities of the pipe; the shape of the cross-section and the mode of making the longitudinal seam are important as regards protection against bursting by ice. In some parts of the country zinc was once almost exclusively employed for leaders; in other parts, tin. Tin-pipes are still perhaps the most commonly used, on the whole, of all kinds, on account of cheapness in first cost; but galvanized-iron pipes are considered superior, and being not greatly more expensive than tin are given the preference in good work. Either material, however, is subject to gradual corrosion from the water which comes in contact with it, more rapid corrosion from the moist salt-air along the coast, and still

more rapid corrosion from steam and from sewer-air. In New York City, for instance, there are many leaders having untrapped connection with drain or sewer, and these leaders, whether of tin or of galvanized-iron, are said to withstand corrosion generally but a very few years.

There are two principal varieties of tin in use for roofing and leader purposes: the old-fashioned or bright tin—"black iron," as it is called, or more and more commonly at the present time a mild steel, covered with a coating of pure tin. The dull tin, which is now largely made, has the coating of tin with an admixture of lead. The bright tin, which alone of these varieties is safe for culinary articles, and which is often also supposed to be best suited to use on buildings, is considered by many whose experience is of value, to be inferior for this purpose to a good dull or "leaded" tin. The latter material, when redipped in the process of coating, resists corrosion from moist and especially from salt air much better than the former. The so-called galvanized-iron is either black sheet-iron covered directly with a coating consisting chiefly of zinc, or it is sheet-tin so covered, the iron having in this case a double coating.

COPPER LEADERS.

Far superior to either tin or galvanized-iron is copper, which is practically unaffected by the ordinary agents producing corrosion of roof-covering and leaders. It has been very considerably employed in first-class work, but its cost is at present a serious bar to extensive use. Galvanized-iron leaders cost perhaps 20 per cent more than tin leaders of the same size. Two or three years ago, before the rise in copper, leaders of the latter material cost approximately half as much again as those of galvanized-iron, but I am informed that they now (September, 1888) cost about two and one-third times as much as the galvanized-iron.

Copper leaders are made of all shapes and sizes used for other materials. Hot-rolled copper was the variety formerly employed on buildings, but prejudice was aroused against it because of its softness and the ease with which it loses its shape. Cold-rolled copper, which is now utilized in good work, is harder and stiffer, and if selected of a grade weighing eighteen or twenty ounces per square foot is found to be a superior and satisfactory material. Copper expands and contracts under changes of temperature much more than iron, and allowance often has to be made for this when the metal is used in construction. In a long vertical rain-leader of copper, provision for change of length is often made by introducing one or more slip-joints, at which there is a lap of perhaps three inches, and at which solder is omitted. The slip-joint of course offers some opportunity for the escape of sewer-air, if that is allowed to enter the leader; but if well-made the joint is claimed to be soon rendered fairly tight by a slight coating which forms on the metal. The protection afforded to tin and galvanized-iron pipes by their distinctive coatings may be further increased by coating with tar and asphalt, or by use of the Adamanta or other coverings.

But while a suitable material is essential to the endurance of the pipe against corrosion, its protection against bursting by ice is to be obtained partly by the mode of joining the material, but chiefly by the shape given the pipe in cross-section. The common tin pipe is made in short lengths soldered together at the transverse joints, each length having a straight longitudinal seam, which is either a soldered lap-joint or a simple locked joint. The lap-joint is not so strong as the rest of the pipe, and under the great expansive pressure of ice is opened. Whatever, then, tends to strengthen the longitudinal jointing of the pipe gives greater resistance against moderate ice-pressure, although no plain pipe of ordinary thickness is proof against rupture by ice. The locked-joint is an improvement upon the plain soldered lap-joint, and is used for galvanized-iron and copper as well as for tin. The plain lap-joint can be strengthened by riveting, and I have seen copper leaders made with a straight soldered and riveted seam, which is claimed to be stronger than the main body of the pipe, the latter yielding first to ice. Galvanized-iron leaders are also made with a patented spiral and riveted seam, which renders them very strong.

SECTIONAL FORM OF LEADERS.

Economy of material for a given cross-section of pipe demands the use of a plain circular form; but it is evident that no shape would be more unyielding against the expansive power of ice, and in order to accommodate the latter and prevent rupture the expedient of a fluted or corrugated pipe was hit upon some fifteen or twenty years ago, and patented. This form of pipe has been very extensively used, and appears to have been generally satisfactory in resisting ice, readily changing its shape under pressure. The galvanized-iron and copper pipes are all to be had of the corrugated form, being usually circular in general shape, but often made rectangular as being more ornamental. A good corrugated copper pipe would appear, all things considered, to be the best available construction. The patent upon corrugated-iron pipes expired a year or two since and they are now manufactured by a number of competing firms. Even if a leader-pipe be used which will not be ruptured, it is, if exposed, liable to become so choked with ice as to be unable to carry off water, and the same thing also happens in the case of gutters. Hence in a climate so cold as that of Boston, resort is frequently had to the use of steam, not so much, however, for the purpose of preventing the formation of ice in freezing weather as to clear a passage for the water when a thaw comes on. Most large buildings, at the present time, have a supply of steam, either for heating or for power, which can without much difficulty be drawn upon during the daytime for use in the way that has been mentioned.

The most common method of using steam for thawing out leaders is to introduce a small jet from perhaps a three-eighths inch or a one-half inch pipe at the base, and allow the steam to rise up through the leader. This plan is followed at the Wakefield Building, on Canal street, in Boston, and as a precaution steam is thus at times introduced also into the base of an iron leader in the Wilde Estate Building. At the Sloane Building, in New York, the same plan has been successfully tried, but has been practically superseded by allowing hot water to drip into the tops of the leaders. Waste steam from the heating and elevator systems passes into small drum-shaped condensers on the roof, and the hot water of condensation is conducted through drip-pipes to the leaders. The climate of New York City is so much milder than that of Boston that comparatively little trouble from ice is experienced, and the common practice of an untrapped connection with drains and sewers, the air of which is warm, tends to prevent serious accumulation within the leaders.

Another method, which is sometimes but less commonly used, is to carry up a steam-pipe through the interior of the leader. At the Cheney Building, in Hartford, Conn., a three-quarter inch steam-pipe is thus employed. This pipe has an iron cap a foot or so above the roof, the cap being perforated by a small hole to permit some circulation of steam, but the hole quickly becomes stopped by rust. The condensation of steam within the pipe and the freezing of the water thus formed has split the pipe at various points; but the steam escapes all the more readily in consequence, and the arrangement is entirely successful in clearing out the leaders.

CLEARING GUTTERS OF ICE.

Even if the leaders are kept open the gutters are very likely to become clogged with ice, and then fail to perform their duty. Attempts have therefore been made to clear these also by the aid of steam, and on the Studio and Museum buildings, in this city, may be seen arrangements of steam-pipes for this purpose. The gutters are of the common half-round metallic type, projecting out from the edge of the roof, the steam-pipes extending along over the centre of the gutters and about on a level with the top. On the Studio Building the pipes are pierced beneath with small holes at intervals of, say, six inches, with the object of directing downward into the ice of the gutter a great many small jets of steam. This device is not satisfactory, however. A hole is melted in the ice by each jet, but ridges are left between the adjacent holes that have to be chopped away. Water also enters from the gutter into the steam-pipe, freezes there and bursts the pipe.

It seems probable that if steam-pipes are to be used in gutters, they should either be arranged with jets closer together than in the case just mentioned, and perhaps directly obliquely into the gutter, or they should be tight pipes laid on the bottom of the gutters, with a circulation of steam assured by an opening at the end or by a properly-arranged return-pipe, and with sufficient grade so that the water of condensation may readily flow off. On the Wakefield Building, and to some extent on the Studio Building, steam is brought onto the roof from the nearest convenient point in a hose, and in that way directed at will upon the ice in the gutters. In the latter building the steam employed is that used for heating, is at a pressure of six or eight pounds only, and is found not very efficient in cutting out the ice; but on the Wakefield Building the steam is that used for power, is delivered under a pressure of fifty or seventy-five pounds, and is considered very satisfactory in clearing the gutters.

In conclusion, it may be said that in the case of large buildings, at least, it is possible, by some of the methods that have been pointed out, to avoid all inconvenience from roof water from whatever source: and on private dwellings, if the water is brought down from the roof in a vertical and unbroken descent and a good corrugated pipe is used, there will be but little trouble. In most cities the destination of the water, whether it be directly discharged into the house drain or into the street gutter, must quickly be the public sewers. To what extent, if at all, this water shall be excluded from the sewers which convey the other house drainage, is a question of importance in certain cities, but its discussion need not be entered upon here.

Church of St. Edmund, the King, London.—The *Athenæum* notes that another of Wren's churches in London has been condemned. It is that of St. Edmund, the King, in Lombard Street, the interior of which is only sixty feet by forty, but its tower and picturesque spire are a familiar landmark. A memorial to spare the tower has been getting signatures. Here was buried when the present edifice was not, but one destroyed in the great fire, one of the first English writers on architecture. His monument bore an inscription calling John Shute

> "him that sought in science sight to publish prudently
> Among the rest of things, the which he put in ure,
> That ancient practice and profound, that bright of architecture."

Shute was a painter-stainer and architect, who in 1550 was sent to Italy, by John Dudley, Earl of Warwick, to study. He published "The First and Chiefe Groundes of Architecture."

ARCHÆOLOGICAL CAMPING IN ARIZONA.[1]—V.

A RECONNOISSANCE TRIP TO CASA GRANDE AND BEYOND.

ONE of the pleasantest features of our life at Camp Hemenway was the reconnoissance work undertaken now and then, excursions off into the mountains and out on the plains in search of other remains of the ancient races. My first experience with an expedition of this sort was in the latter part of January. Three weeks before, I was in the midst of one of the severest winters I had ever known, and had passed in Chicago the most marrow-penetrating and uncomfortable January day I can remember. Now the only reminder of winter was to be seen in the gleaming white-robed peaks standing guard over our valleys to the northward and eastward, dazzling in the transparent atmosphere and undimmed sunshine. To be sure, when the sun went down the dry air became sharp and overcoats necessary, while the mesquite-wood fires roared in the little stoves and cheerily warmed the tents. In the morning, now and then, the *acequias* were skimmed with ice, but an hour or two of sunshine was enough to assure us June weather for the rest of the day. This expedition, however, was to take us out into the open air day and night, and in setting out I had some misgiving as to how we should stand the cold after sundown.

For several days preparations for our trip had been under way. To assure shelter in case of the rare contingency of stormy weather a "Gilbert-Thompson tent" was determined upon, and Sanchez, the versatile and volatile Mexican, had been patiently at work with canvas and needle in the midst of our plaza, putting it into shape, under the supervision of Don Carlos. Mr. Garlick had brought the idea from the United States Geological Survey, where, during his long service as surveyor, he had thoroughly tested the advantages of this tent. Mr. Gilbert Thompson, one of the chief officials of the Survey, will receive the gratitude of all camping-parties who make a trial of his simple and ingenious tent, and tent-makers would do well to adopt the pattern for a standard. Our tent was made with some modifications devised by Mr. Cushing and Mr. Garlick, between them. Its advantages were many, including the features of simplicity, compactness, capacity for expansion, and ease of putting up and taking down, having no guy-ropes, cross-pieces of wood, etc. It can best be described by imagining a tent pyramidal in shape, and with a diamond for a ground plan. Cut this structure in two and set the halves ten feet apart or so and connect them with flaps, making an A-tent closed in at each end with a V. All that is required for a support is a pole of seven or eight feet at each end, thrust up through a hole into which it fits at the apex, and firmly guyed by tent-pegs holding the canvas to the ground at the corners of the triangles. Three or four additional pegs were sufficient to hold the flaps to the ground. The whole tent could be pitched ready for use in three or four minutes, and taken down and folded up in half the time. The front flap was made to be laced to the sides, but in pleasant weather it was raised up and supported on sticks, each guyed with a single cord. This gave increased room and shelter, with agreeable shade from the hot sun by day and giving a pleasant, veranda-like effect. Of all tents, this pattern is the most picturesque. In a second and larger tent, afterwards made to be used in case that two reconnoissance parties should be in the field at the same time, a great improvement was effected by making both sides of the A-section movable, like the front flap in the original pattern. With this device either side could be raised at will, changing the face of the tent according to the direction of the wind, so that it would not be necessary to turn the whole thing around to obtain shelter. On hot days the raising of both sides gave a free passage of air. With four triangular pieces of canvas fitting onto the sides of these raised flaps, and curtains at each end, all reefed or laced together, the capacity of the tent was enormously increased, making a sort of canvas hall. In this shape it was used as a dining-tent at Camp Hemenway, when not in use in the field; and in three or four pouring rains that we had it was well and successfully tested as to its storm-proof qualities. The first tent was taken by Dr. ten Kate on a long trip of several weeks, made for anthropological observations among the Pima and Papago Indians, and was of invaluable service.

Our trip began on the morning of Monday, January 28. The men had been preparing all the morning, under the direction of Don Carlos, piling onto the wagon the fodder for the animals, provisions for ourselves, kettles and tins, picks and shovels, the whole followed by our mattresses and blankets, with our needed extra clothing and toilette articles rolled up within and securely held by stout straps. On either side of the wagon were secured two large casks for water, a most essential feature for any journey in this arid country, where "dry camps" often have to be made. At last everything was ready, and we started with a great clattering of hoofs, rattling of wheels, shouting and gayety, for the prospects of a week of roving appealed to the primitive man latent within us all, and ready to assert himself when aroused; so the opportunity for getting closer to Mother Nature and making ourselves savages, so far as we might choose to be, produced a marked elation of spirits in everybody, from the Director down to the laborers.

On the high seat of the great lumbering "Studebaker," drawn by four big mules, were perched Mr. Cushing and Don Carlos, the latter driving, and swinging a formidable long-lashed whip, which, in the course of the journey, was destined often to induce into more vigorous exertions the two off animals, for it is the custom always to hitch the two laziest ones on the right side within easy reach of the driver's persuading facilities. Behold, reclining on the load, with our bedding and the tent making easy seats, were four of the Mexican laborers, including Sanchez, who was taken along as cook and interpreter for intercourse with the Pimas. His cooking was something fearful and wonderful; but his interpreting was excellent, for among his many accomplishments was that of linguist; he was a master of the "polite languages" of the Southwest: Pima, Papago, and various aboriginal idioms of Sonora, in which Mexican State he was born of a Papago mother and a Mexican father, the various race strains derived from the paternal side evident in him, according to appearances, in Iberian, Moorish and Negro, together with enough Indian to make a considerable addition to his maternal heritage from that source. His vivacity and vagabond good nature made him a universal favorite, so that we even consented to overlook his grave culinary deficiencies for this occasion only; on our next trip Mr. Cushing took care to make another appointment to that important office.

In tow of the wagon trotted the sleek and sturdy Douglas, and Dr. ten Kate and I followed up the rear in an easy buckboard drawn by Bob and Mary, for whom Douglas, in accordance with the remarkable affinity of mules for horses, was a magnet that, so long as he was in advance, spared us the necessity for any use of the whip, and indeed often cost much muscular exertion to keep them far enough back out of the dust.

Turning southward, we proceeded along the even-surfaced plain that now sloped imperceptibly towards the Gila, and were soon within the limits of the Pima reservation that stretches for miles along that river. To the left were the Zacaton mountains, and to the right the steep wall of the Estrellas rose abruptly just beyond the river. The road was now sandy, now hard and smooth as macadam, and around was the characteristic vegetation of the Southwestern desert: stretches of sage-brush in gray monotony; areas of the shrub-like hediondillo, or greasewood, with its evergreen leafage of dark and unrefreshing hue; occasional expanses of mesquite timber, scraggy-limbed and low-growing; and here and there spaces of bare ground, sometimes brown, and again snowy with alkali exudations, while varieties of cactus gave final character to the landscape, with its fleecy-looking chollas that in the distance had an effect of browsing sheep, and the grotesque nopals with their disc-like leaves, to the great saguaros, or giant cactus, that gave the desert a sort of populous air, seeming like some strange being, standing in mute silence, with their tall column-like trunks towering forty or fifty feet close at hand, or rising in dark lines out of the bush in the distance, their side-branches turning sharp right-angles upwards, like uplifted and warning arms.

While the elements of beauty, as we commonly regard it, are deficient in this landscape, still it has much of interest, and even charm of its own; and following the eyes of a poetic and sympathetic beholder like the late Mrs. Helen Jackson, whose descriptions of unattractive features like sage-brush and sand-wastes linger delightfully in the memory, much is revealed that might have remained hidden. The glorious sunshine, pouring down full and warm, gives a calm, large joyousness to what under a different sky would be a stern and gloomy country. But here Nature, though impassive, and unresponsive and overwhelmingly vast, suggests an unrestrained freedom to her children in a spaciousness where they can be themselves if they will, with the gladness that is born of ample room for the feet to rove and the thoughts to roam. My companion said that this broad landscape, with its tawny distances showing seemingly forever the same in the transparent atmosphere, had a great fascination for him, appealing to him more strongly than the most beautiful cultivated scenery, with its suggestions of the restraints and conventionalities of civilization.

Towards noon we came to the remains of great irrigation canals, and the ruins of an ancient city, with the mound that signified the crumbled walls of a great central temple, or "House of the Priests," of the Casa Grande type, and an enormous "Sun Temple," or basin-like oval of crumbling earth, which some investigators had pronounced

[1] Continued from No. 683, page 44.

to be the remains of reservoirs, as they found them recurring here and there, forgetting the fact that they were raised above the surface of the surrounding ground and therefore could not possibly have been used to hold water, since there was no means of filling them. By close observation and analogy Mr. Cushing perceived these to have been the places of religious assemblage and ceremonial, — now usually called by the Spanish name of *estufa*, from the fact of their being underground in the northern Pueblos — presided over by the Priest of the Sun, a functionary who is distinct from the hierarchy of the Priests of the House, and the spiritual head of the community. These buildings were evidently in the shape of an inverted boat, with wattled frame and mud-plastered. The Pimas still construct their huts in this form, which was probably the original type of primitive dwelling in this region. According to the lines of sociological evolution, the customs of ancestors gradually become the attributes of the gods, as they disappear from common usage, and thus the primitive dwellings became the houses of the gods, and the chief religious edifices are thus fashioned. After gathering numerous examples of the fragments of decorated pottery that littered the ground in great profusion, we proceeded southward, and soon came to the cultivated fields of a Pima village bordering the Gila, whose course was indicated from afar off by the long lines of cottonwoods growing on its banks. Their branches were leafless, and the silvery gray of their bark gave them the appearance of a silent ghostly procession. The Gila here is not so wide as nor of such volume as its tributary, the Salado, which joins it some twenty miles or so below where we crossed. The mid-day sun was hot, the stream had a sandy bed, and the thought of enjoying a river-bath in January appealed to me with fascinating force, and while waiting on the thither bank for the more slowly-moving wagon to come lumbering up and across, I stripped and plunged in. It could be hardly called a plunge, however, for the stream was very shallow, and though I waded from bank to bank in search of some pool, the greatest depth was scarcely more than a foot, and only by dint of rolling over in the water could I manage to get wet all over! But it was pleasantly warm, and the effect was delightfully refreshing.

We wished first to visit the locality known as Casa Blanca (the White House), where there were said to be some interesting ruins. The overflow of some of the Pima *acequias*, as a consequence of the first irrigation of their wheat fields, had made our regular road impassible. Sanchez, as interpreter, obtained the information of the direction from a Pima hamlet which we passed, while the squalid-looking Indians gathered around in mute curiosity over our appearance. The Pimas are a harmless, peaceable sort of Indians, rather degraded-looking as a whole, and most of the women had the heavy jaws, coarse and brutal mouth and long upper lip that characterizes the lowest Irish type, and suggests a survival of the features of a lower race that once peopled all Europe, and was probably more extensively absorbed in the Celtic than any other of the Aryan peoples, since the Celts formed the advance wave of the new ethnic invasion. The nude children standing shyly around had much of the bright-eyed attractiveness common to childhood in all races. The Pimas are an exceptionally dark-skinned Indian people, having a duskiness equal to that of many negro tribes. This is probably owing to the slight altitude. I have noticed that in the warm latitudes the altitude of the country seems to have a considerable influence in determining the color of the skin. The Indians on the Mexican table-land are much lighter than those on the coast, and I have observed that the Mexicans in New Mexico are very much lighter in complexion than those of these regions in Arizona and Sonora, where the altitude is inconsiderable.

Desiring to cover as much ground as possible in our day's journey, we had made no halt for lunch, intending to get an early supper. Towards mid-afternoon the gnawings of hunger began to be acute, but my companion, the doctor, had fortunately a package of chocolate with him, and it satisfied our appetites for a while. At Casa Blanca there is a Pima village, and a trading-post belonging to the firm in Florence, Tex., that has the monopoly, by contract, of trading with the Pimas on their reservation. The business is said to be very profitable, consisting mainly in bartering cotton cloth, gaudy calico prints, tobacco, sugar, gewgaws, etc., at a high valuation for wheat, skins, etc., at a low valuation. Like most of the large commercial houses in the Southwest, the firm is a German one, and has mainly German employés. There were great piles of wheat in bins, and my hunger had by this time returned to such an extent that a handful of the plump grains was eaten with excellent relish!

Near the post rose a great mound similar to that at Los Muertos, surrounded by the ruins of a considerable ancient city. This was Casa Blanca. From the name having been applied to the mound, it seems as if the walls must have been partially standing at the time the Spaniards first came here. Its walls were evidently white or whitish in color, and its name was probably given in contradistinction from the neighboring Casa Grande, which was also known as "the Red House." Two or three shallow holes in the mound indicated that some excavation had been attempted. Pinart, the French archæologist, had been here a few years before, and these were probably his traces. They amounted to nothing more than mere peckings at the structure, and could have revealed nothing conclusive. Mr. Cushing had thought of making some examination here, but there was such a swarm of Pimas about that nothing could have been done without great inconvenience, and so we kept on, after replenishing our water-supply, intending to camp at the first inviting spot a mile or so to the eastward. We soon came in sight of another great ruin-mound, and so it was decided to camp in a pleasant thicket a little ways from the road, where wood for our fire would be forthcoming. Our Gilbert-Thompson tent was pitched in a minute, our beds were unrolled, and we lay comfortably stretched out, watching the preparation for supper and restraining as best as we could the impatience of hunger, to which the minutes before meal-time seem interminable hours. Fortunately an abundance of canned food in our mess-chest made elaborate preparation of our meal unnecessary, and as soon as coffee was made the supper had been spread out on top of the chest, which was so contrived as to be converted into an excellent table, and we fell to with gusto.

For me that cosy camp at Las Cenizas, as we named the place from the abundance of cinders found in the ruins the next morning, had the indescribable charm of novelty; and, indeed, the pleasant nights with which we were favored during our week's trip had the delightsomeness of a semi-vagabond life that for me was not in the least staled by repetition. The air was very mild, and perfectly calm, with the dry purity of the desert. As the night deepened, the bright blaze of our fire made the tent glow with an intense brightness against the back-ground of the thicket, and the sage-brush danced with mysterious, elusive shadows, populating the ring of the firelight which converted the gray bushes into a gilded feathery growth spreading about us.

Sylvester Baxter.

[To be continued.]

Societies

Association of Ohio Architects.

The fourth annual Convention of the Association of Ohio Architects was held at Dayton, Ohio, on the 15th inst. The meeting was well attended, and was a very interesting one both professionally and socially. The Convention passed a resolution inviting the new American Institute to hold their first Convention at Cincinnati, and appointed a committee of seven to make proper arrangements for the entertainment of the Convention, should they decide to meet as invited.

Mr. Wm. Martin Aiken, of Cincinnati, gave a very interesting account of his recent trip to Europe. Mr. J. W. Yost, of Columbus, read a paper upon the subject of "How we should build," and also read the new law passed by the Ohio Legislature governing the erection, as to their safety, of public buildings hereafter erected in the State of Ohio.

Toledo was selected as the place of holding the next Convention, and officers were elected for the ensuing year as follows: E. O. Fallis, of Toledo, *President;* J. W. Yost, of Columbus, *Treasurer,* and N. B. Bacon, of Toledo, *Secretary.*

The afternoon was spent in a Tally-ho ride through the city and out to the Soldiers' Home. A banquet was given by the resident architects to the visiting architects, in the evening; and, take it as a whole, the Convention can be numbered among those which have been decided successes.

Western Association of Architects.

There will be a meeting of the Board of Directors of the Western Association of Architects, on Tuesday, September 17, at the office of the Secretary, Chicago, Ill., for the consideration of applications of membership and the transaction of other business.

N. S. Patton, *Secretary.*

Communications

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith: nor do they hold themselves responsible for opinions expressed by their correspondents.*]

The Longitudinal Shrinkage of Wood.

Toledo, Ohio, August 20, 1889.

To the Editors of the American Architect: —

Dear Sirs, — In your last issue I notice a communication upon the shrinkage of timber endwise. I wish to say upon the subject, that in my experience I have frequently noticed that woods will shrink endwise, but I believe the cause to be on account of cross-grained stuff. I have noticed in the shrinkage of wooden joists, that a crack will occur in the plastering, in the angle formed by the walls and ceilings, of various lengths and widths, the cause being the unequal shrinkage of the joists caused by some being cross and others straight-grained, the cross-grained ones shrinking less than the others; and the floors on top being nailed to all of them, keep them level on the top surface and raise those that shrink off of their bearings, which also causes ceilings that may be level when new to become very much out of level after shrinkage has taken place, and to crack.

The same principle may be observed in flooring dressed before being thoroughly kiln-dried (as most of our yellow-pine floors are); the same board will vary in width in accordance with the direction of the grain. Picture mouldings secured to plastered walls afford an excellent opportunity for the observation of the shrinkage mentioned.

Yours truly, E. O. FALLIS.

THE INCLINATION OF PARALLEL VERTICAL WALLS.

NEW YORK, August 9, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— Having read in the *American Architect* of August 3, an extract taken from the Pittsburgh *Despatch*, relative to high walls being out of parallel, I beg to inform you that in the October (1885) number, page 81, of the *Builder and Woodworker*, I published this fact in the following paragraph:—

"All plumb lines drawn to the earth's surface continue to its centre, showing that walls and other supposed parallel erections are not in reality parallel, and if continued to a sufficient height, a difference would be perceptible in the distance between them."

While working on an elevator in Connecticut, in 1883, I first noticed this practically, as the wall-plates of the upper-framing (placed at a height of 137 feet), which were laid out and framed on the ground, when set on the posts and studs, were found to be short. At first it was thought that the walls were not carried up plumb, but as they were proved perfectly so, there was really no reason why the plates should be short. I reasoned the above from Newton's theory, but could scarcely attribute the difference to this, because the walls were only 50 feet apart at the base, and I did not consider that the small curvature of this minute fraction of 25,000 miles would materially affect the width. Perhaps some mathematician would be tempted to work out the exact amount of variance in lengths of feet in proportion.

Respectfully yours,

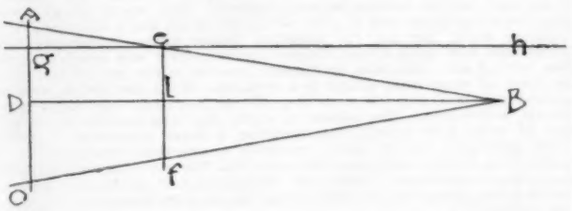
OWEN B. MAGINNIS.

NEW YORK, August 10, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— In your issue of August 3d there is a clipping, "Curious if True," which, "*if true*" is "*curious*," since it violates all geometric reasoning.

In the first place let us compare by similar triangles the divergence to find the radius of the sphere.



Bisecting A B C by the radial line D B, and considering e f the circumference or crust of the earth, for such a small unit practically a straight line, 100 ft. long, A C the roof of building 100 ft. 3 in. A e 110 ft. Draw g h parallel to D B then will A g e and e l B be similar triangles in which A g = 1.5 in. e l = 50 ft., ∴

1.5 : 600 :: 110 : 44,000

that is, if a building 110 ft. high and 100 ft. wide is 3 in. wider at the roof, the earth is 44,000 ft. or 8⅓ m. radius or about 52⅓ m. in circumference.

Again suppose there were a continuous belt of houses 100 ft. wide, around the earth, whose roofs were 100 ft. 3 in. wide. How high would it be required to build the houses? The earth being in round numbers 25,000 m. circumference.

25000 × 5280 ÷ 100 = 13200000

(13200000 × 3 ÷ 12) ÷ 5280 = 625 m.

25000 + 625 = 25625 m.

As the radii of circles are to each other as their circumferences,

25000 : 25625 :: 4000 : 4100

That is a building 100 ft. wide would have to be 100 *miles*, not 110 ft. high, to be 3 in. greater on the roof line.

We can also call logarithms to our aid, but, from the acuteness of the angle, it will not be absolute.

Taking the result of our first computation as a basis 44000 ft. radius, we can state our general problem.

Given an isosceles triangle whose sides are 44000 ft. and base 100 ft. Required the angle at the vertex, here a = 44000 b = 44000 c = 100 C? ∴

(a. c.) log. (s + s′) 44000 = 5.3565473235138125688 2

log. (b + c) 44100 = 4.6444385894678385360 1

log. (b − c) 43900 = 4.6424645202421213706 3

log. (s − s′) = 14.6434504332237724754 6 ∴

s − s′ = 43999.772985

= ½ (s + s′) + ½ (s − s′) = 22000 + 21999886492 = 43999.886492

log. s + (a. c.) log. b = log. Cos. C.

log. s (43999. 886492) = 4.6434515548497979166 8

(a. c.) log. b (44000) = 5.3565473235138125628 2

log. Cos. C. = 9.9999998783636104795 0 ∴

C = 7′ 50″

Now given an isosceles triangle 44100 ft. on a side, with an angle at the vertex of 7′ 50″, required the base.

180° — 7′ 50″ = 179° 52′ 10″ 179° 52′ 10″ ÷ 2 = 89° 56′ 5″

(a. c.) log. sin. B (89° 52′ 10″) = .0000003

log. sin. C (7′ 50″) = 7.3576723

log. b (44,000) = 4.644536951

log. c = 12.002209551 ∴

c = 100.5. That is the roof line would be 100 ft. 6 in., the inaccuracy comes in reading "log. Cos. C = 9.999998878 + as 7′ 50″ which is slightly in excess. 7′ 47″ probably being nearer, though the tables read no closer than 10″.

Hoping this proves the "architect" to have been right, that is in such relatively small distances on the earth's surface, plumb lines are practically parallel. I remain, yours respectfully,

EDWIN R. STORM, *Architect.*

A BATH LINING.

KANSAS CITY, MO., August, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— Can you inform or enlighten me on the following subject? I wish to find some substance which, applied to the inside of a large cement-lined plunge-bath would render the surface white or nearly so, and give a smooth surface impervious to water. I wish to avoid the use, if possible, of vitrified tile lining on account of expense. Could you also inform me where I could obtain the last mentioned material for lining? Any information you could give me on the subjects would be greatly appreciated.

Truly yours, T. E. GOOCH.

[THE only material we know of that seems to give promise of being satisfactory is the "Bath Enamel," which is imported by E. Aspinall, 98 Beekman St., New York. Plain glazed tiles can be obtained from any of the dealers in tiles who advertise in our columns.—EDS. AMERICAN ARCHITECT.]

AN ALLEGED PURLOINING OF DESIGN.

NEWARK, N. J., August 24, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sir,— I made drawings for a dwelling-house in Newark, and the house was built after same. Now a second party wants to duplicate the house and employs another architect, and he goes to the builder of my house and gets all the drawings, etc., and follows them as I understand, line for line. Now is there any way that I can get compensation for the use of my drawings, and if so, whom shall I look to for same, or are my drawings public property? By answering same you will greatly oblige.

Yours respectfully, W. F. ZIMMERMAN.

[YOU could probably get whatever damages a jury might see fit to award you from the owner of the house copied from yours, if the jury thought that it was with his collusion, or by his direction, that his architect used your drawings. You would naturally claim as your damages whatever you would have made if he had employed you as architect, instead of the other ornament to the profession; and we are inclined to think that most juries would consider this a just claim.—EDS. AMERICAN ARCHITECT.]

A PARTY-WALL QUESTION.

YORK, PA., August 21, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— Will you kindly submit the following party-wall problem to your Building Law department? A owns a corner-lot and building thereon. My client B (an estate), owns adjoining lot from which all of buildings (except portion of front cellar wall as below noted) has just been removed to make way for new building. Corner, or A's house, was built many years ago. When B's house was erected some years later, A's brick wall became a party-wall with such additions (presumably by B) to length and height of said party-wall as were necessary to increase required size of B's building. Some years later A increased the size of his building by building on top of party-wall to make the required additional story height. Some years later B increased the depth of his building, constructing the necessary party-wall at (presumably again) his own expense. No additions have been made by B to the party-wall for the past twenty-five years. Previous to this time no dispute about the party-wall can be recalled by B's family. No recorded or written agreement has been found. A thinks B ought to pay him for use of the wall for the new building. B's plans require no addition to party-wall. A further says that his deed calls for 28′ 9″ front, whereas the actual measurement is 28′ 3″, therefore B must have 6″ of his ground. B's deed calls for a "half lot," feet and inches not mentioned. A half lot in this street means 28′ 9″. The actual measurement of B's front in width is 26′ 11″, or 1′ 10″ short. About 5′ in length of old cellar-wall, on front and abutting against party-wall, has been left standing; on this it is proposed to lay granite sill and start brickwork that is to be built against old party-wall.

A portion of party-wall must be underpinned to accommodate extra depth of B's cellar. EQUITY.

[Everything in this case would depend on the party-wall agreement, which might have been verbal and still be valid, if it can be established by evidence. If there is absolutely no means of finding out what the agreement was, we should say that the presumption was that each party, in making additions to the wall, did so, as is usual, at his own expense, but with the understanding that his neighbor, if he subsequently used any part of the new additions, should then pay half the value of the portion which he used. In the present instance, B seems to be intending not to add to the party-wall, but to use a part of that already existing that he had not used before, and he is presumably bound to pay A half the value of the additional part which he is now going to use. The underpinning of party-wall, to increase depth of B's cellar, would in the same way be at B's expense, and if A should subsequently deepen his own cellar, he would be bound to pay B half the cost of the underpinning of which he then enjoyed the advantage. Whether A or B has more land then he is entitled to, is a a question for surveyors to settle.—Eds. American Architect.]

NOTES AND CLIPPINGS

Reversals of Building Practice at Paris.—"The engineering exploits at the Paris Exhibition," says the *New York Sun*, "violate in many cases what might be called axioms. An arch has always been rigid at its crest, a tower broad, thick and solid at its base; and just in proportion to the span of the arch or the height of the tower have the keystone and base been ponderous. In the Hall of Machines, with a truss-arch span of five hundred feet, the crest of the arch is in no way united, but the two elements of the arch simply lean against each other, a transverse steel roller receiving the enormous pressure of contact. The base of the arch, instead of widening out and being heavily grounded in masonry, to stand lateral stress, comes down to a point, and rests directly on a cast-iron plate with a circular bearing. These audacious contrivances are to permit expansion and contraction, and the whole vast roof, over a sixth of a mile long, rises and falls with every change of temperature."

The London Fog is Healthy.—If London is the metropolis of the land of fogs, there is much consolation to be found in the fact that in spite of its smoke and its fogs it is not only one of the healthiest cities in the world, but is growing healthier every year. According to the official statistics for the quarter ending June last, our annual deaths are only at the rate of sixteen per thousand. If we could eliminate from the calculation some overcrowded and notoriously unhealthy districts, the figure would, of course, drop considerably. Still more remarkable would our sanitary condition appear if the area were confined to the high and airy suburbs in which so large a proportion of those who are by day "in populous city pent" are fortunate enough to dwell. We have only to contrast this condition of things with the statistics of other capitals, to see how great is the advantage we enjoy. In Paris, which shows a comparatively good record, the mean annual death-rate is 32.10; in Berlin it is 27.5; in Vienna, 26.7; in Munich, 32.9, and in St. Petersburg, 43.7. In Brussels, which appears to be the healthiest of Continental cities, it is 18.9. To sum up the case, the death-rate during the quarter in twenty-nine colonial and foreign cities, having an aggregate population exceeding 16,000,000 persons, was 26.6 per 1,000, or more than 10¼ persons per 1,000 in excess of the London death-rate. —*London Daily News.*

A Large Vault.—In the burglar-proof department of the Diebold Safe Works there stands a house of steel that in a short time will contain a good share of the wealth of the prosperous State of Kansas. It is a steel burglar and fire proof vault, about completed, for the new State Treasury building being built at Topeka, Kan. The vault is large enough for a dwelling for a small family, being 30 feet long, 17 feet high and 15 feet wide. The structure is set up and being carefully examined at the works, preparatory to its shipment, which will be in about a week, and for which about fifteen cars will be required. The walls are of the best chrome steel, 2 inches thick, in four one-half-inch layers. The entrance is a triplicate door, with a total thickness of 8 inches, fitted with a consolidated time-lock and special bolt device. Twenty-four bolts, 1 3-4 inches in diameter, are in the door, which weighs 5000 pounds, and is opened and closed with a special screw apparatus. The vault complete weighs about 200,000 pounds. Hundreds of bolts are used, but none penetrate from the outer to the inner layer of steel, each bolt only passing through two of the four layers of the wall. The inside of the door is covered by French plate glass, showing the workings of the locks and bolts, and the exterior is handsomely ornamented with nickel and gold. The vault contains two floors, the first for money and the second for valuable documents, etc. A staircase leads from the first to the second floor, and the vault will be lighted by electricity. Two large Diebold burglar-proof safes will be placed inside the vault. The vault and two safes will cost, after being put up and ready for use, in the neighborhood of $25,000. In the burglar-proof department of the Safe Works half a dozen safety-deposit vaults of smaller dimensions, but larger than the ordinary, are being built for banks in different cities.—*Canton (O.), Repository.*

More About the Adventurer's Moiety Stock.—A sale by auction was made in London on July 17, which in its way is as noteworthy as the sale of Millet's picture. The property disposed of was "one entire and undivided share in the Adventurer's Moiety of the estates and interests of the New River." The "Adventurer" was Hugh Myddelton, the projector of the New River, and this is the first share of that property which has been sold since the work was completed in the year 1613. The value of a share at that date was £100. There were seventy-two shares in all; half were taken by the King and half went to Sir Hugh, who was knighted by James I., in recognition of his work. The King's shares were afterwards sold by Charles I. to the second Sir Hugh Myddelton, for a yearly payment to the crown of £500 in perpetuity. The net return on these thirty-six shares was last year £93,900, though the nominal capital of the company, as shown by Parliamentary returns, is only about three and a half millions. The company possesses the exclusive right of supplying water to all the northern suburbs of London, to the whole of the city of London and part of Westminster, to several wealthy parishes in the West End, and to parts of Middlesex and Hertfordshire. Valuable estates also belong to it, the chief of which, the Myddelton Square property, consists of fifty acres in the very heart of London. The New River aqueduct was an object of public interest and curiosity long after it was completed. Evelyn notes in his diary a visit to it in the year 1686. The share that was sold the other day brought £122,800.—*N. Y. Evening Post.*

TRADE SURVEYS

So many new facts and conditions have to be taken into account in the formulation of intelligent conclusions concerning business and trade that it is difficult at times, and especially at this time, to reach results that will stand the test of after-happenings. There has been a general overhauling of accounts, a general examination of securities, a wiping-out of accrued indebtedness, a scaling down of expenses and cost. Banks have been setting a good example. Railroad companies have been reorganizing and rearranging their affairs, buying stock and power when needed, ordering necessary new work to be done, and in every way preparing for even sharper competition which seems inevitable. Manufacturing interests are realizing narrow margins, but there is a good volume of business. The volume of money is sufficient for commercial needs; reserves are low; even the Bank of England is down to $57,500,000. Prices generally are firm. Production is kept down to actual or supposed needs. Accumulations, where they appear, are simply supplies awaiting call. The textile manufacturing interests feel better. Hosiery manufacturers, since the reformation in appraisements, have more to do. The woolen interests meet in New York, September 17, to confer for their better protection. Cotton-goods production is a little ahead of the market. Iron prices are advancing abroad, and are very strong at home. Ship-building wants are crowding supplying sources. House and mill building activity has not diminished, although fewer permits are being taken out as the close of the active outdoor season is near at hand. House investments have paid well this season, but building authorities regret to see in many quarters a partial return to the practice of building extremely cheap houses. Much activity prevails in mill and shop extension, both as to space and power. Machinery builders have much work promised for the fall and spring, but, on all ordinary work which can be had in the average shop, prices are cut low. The locomotive builders have secured more work this year than last, but not until the third quarter of the year has the increase become apparent. Crop reports afford much hope for strong prices and a good movement in all trade channels. The business world has not yet forgotten former trade depressions, and remembers they came almost without announcement and remained until they burned out. Economic or financial knowledge has not yet been able to ward off these evils, except in a measure. Since the last depression several steps have been taken out of conditions that rather encouraged commercial misfortunes. The volume of money has been doubled, exchanges can be made more rapidly, transportation is lower, production is under more intelligent control, and a generally symmetrical development has taken place, which avoids much of the friction that was incessantly disturbing tranquil conditions. Trusts and combinations are quietly multiplying, which is but another way of stating that larger organizations are supplanting smaller.

The step from the individual business-man to the firm, and from the firm to the limited company, and from that to the larger corporation, is now being followed by a larger step in the same direction. Competition is as mighty a factor in the commercial world as gravitation is in the physical, and affinity in the chemical, and no temporary suspension of that great power of competition need cause alarm. While these new giants are putting on their new clothes and trying their newly-acquired strength, they may seem to be able to override and disregard the general interests, but the logic of the situation forbids the doing of much harm. The labor market is quiet, and there is very little superabundance of labor in the mechanical branches. In some industries wages have been advanced; in some, as for instance in mining, in a few fields, wages have been reduced. Striking agitation has ceased to be the policy of all the larger organizations. The programme formulated some eighteen months ago, of striking for eight hours next spring, has not been withdrawn or altered; but many things have since happened, which in the opinion of the wiser heads call for further consideration before striking the final blow. Many branches of organized labor have no more than a sentimental interest in the question, but labor is easily aroused to rash action, and it is therefore best to be ready for the worst. The attempt to draw all branches together is more formidable in appearance than in reality. The question is, will the paper-union of a few heads bring the masses of the respective organizations into hearty accord for coöperated effort? The probabilities are altogether the other way. The speculators, the investors, and the manufacturers, who are enlarging, or are anxious to enlarge their plants and power, are all studying the present situation with intense interest. Not for years has there been such a speculative desire, but the danger holds it in check. Investors are anxious for a final settlement of railroad questions, but the railroad affairs, especially in the northwest, are in a worse muddle than ever. The manufacturing interests are enlarging and expanding, because there is nothing else to do, and no sound reason for not enlarging. Little traders and manufacturers are springing up faster than ever in the new states recently supplied with more abundant railway facilities. Margins on most investments are declining, but with this decline there is a greater wish of investing capital. Mining operations, under better managements and more scientific methods and cheaper transportation, are paying better, and therefore are attracting more capital, the bulk of which comes from home sources. Foreign investors shun railroad and mining stock, cattle ranches, and the like, having been unfortunate for years past in much of this business. Americans, with better opportunities and assisted by the establishment of banks all over the newer sections are making more profitable ventures.

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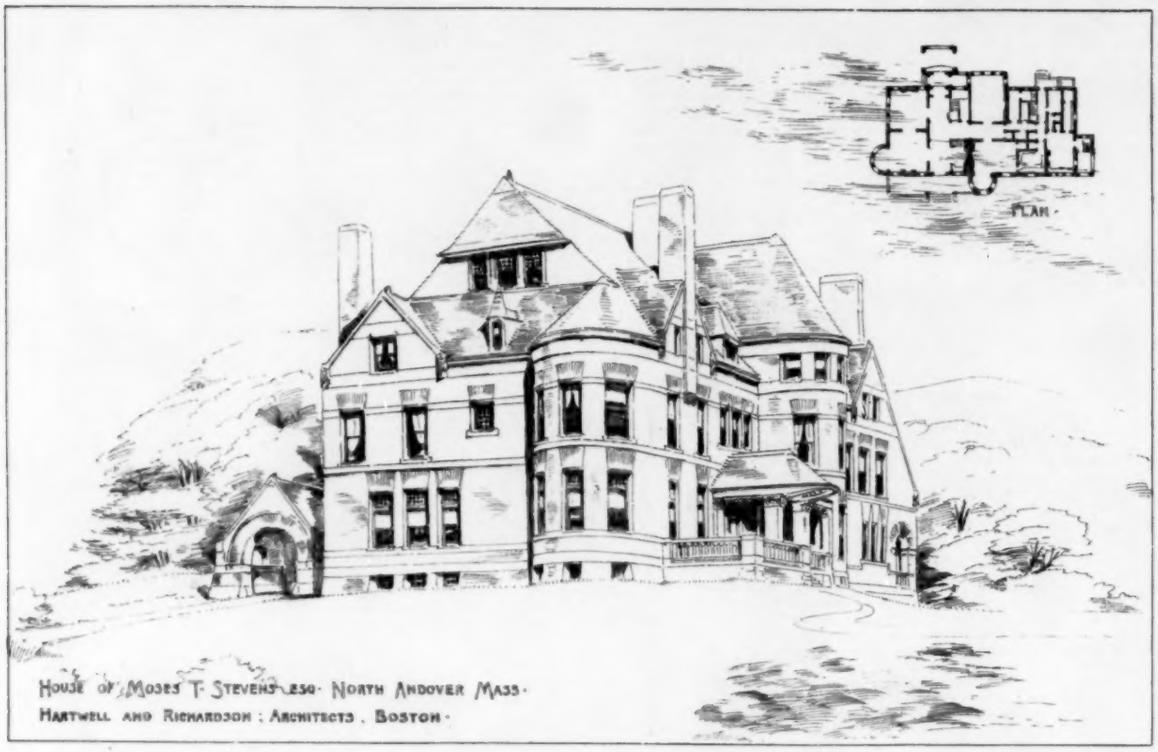

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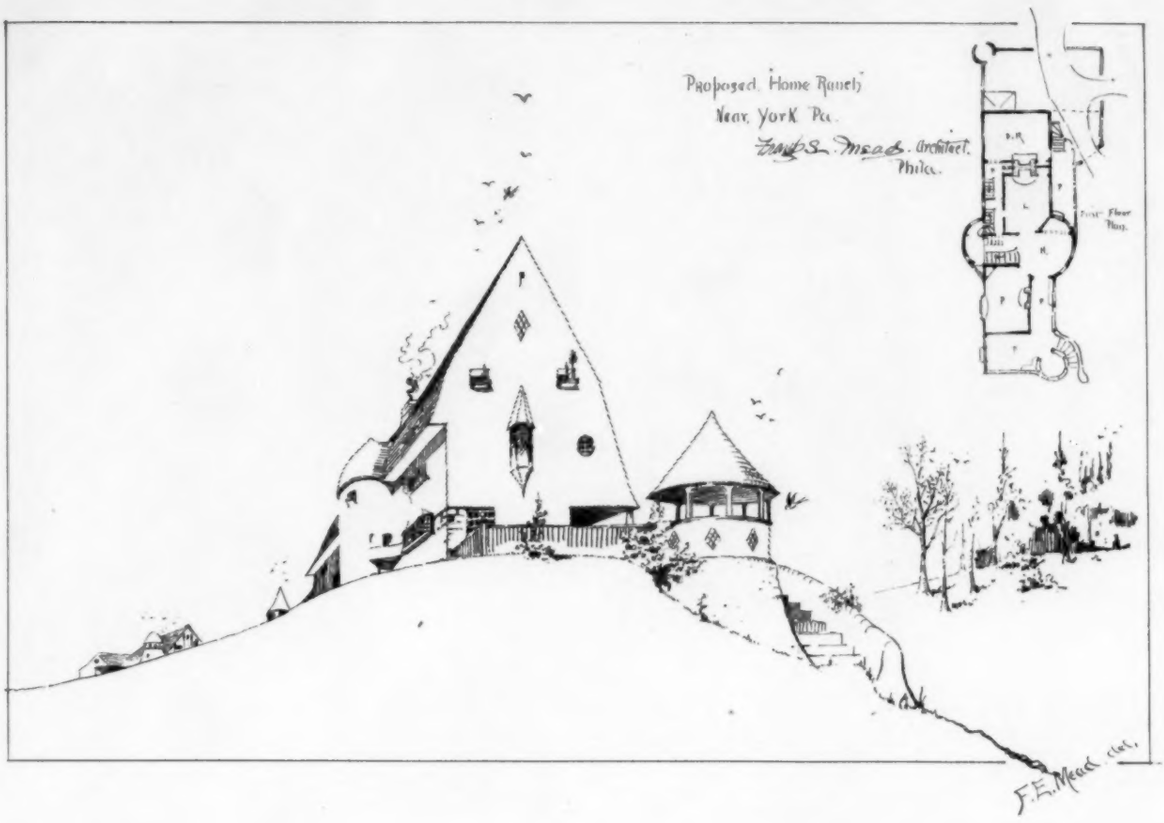

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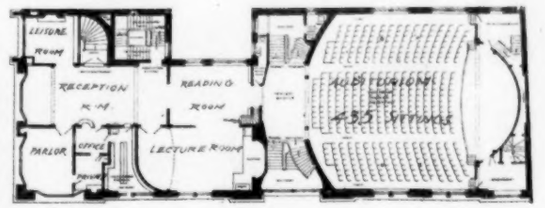
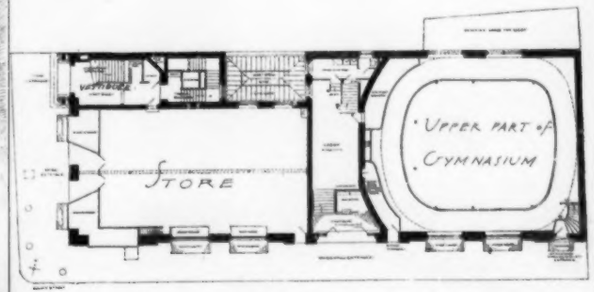


SECOND FLOOR PLAN.



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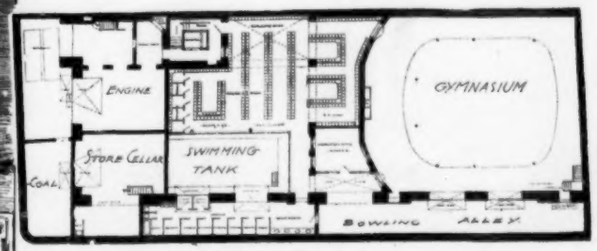

BASEMENT FLOOR PLAN.

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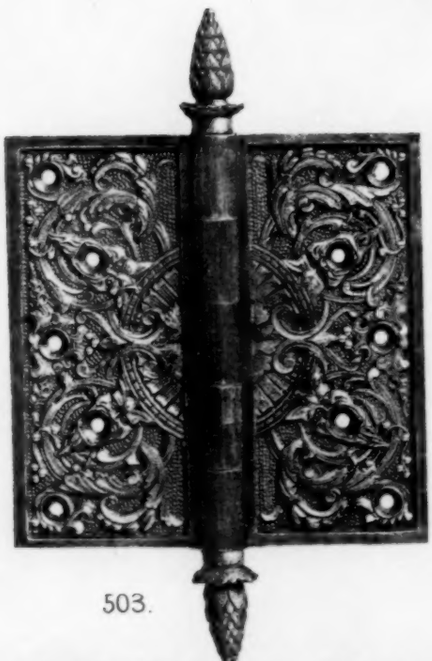

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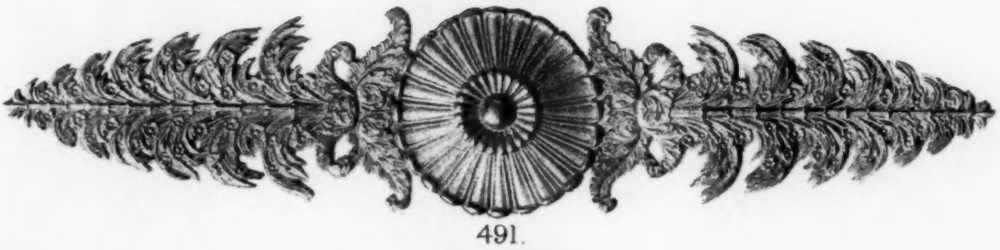

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